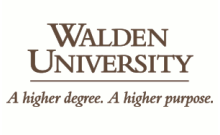

2019

Improving Gonorrhea Result Notification and Response Among African American Women

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This is to certify that the doctoral dissertation by

LaShonda Ouk

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
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The Office of the Provost

Walden University
2019

Abstract

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by

LaShonda Ouk

BS, North Carolina State University, 2006

MBA/MHA, Pfeiffer University, 2010

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Science

Walden University

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Abstract

Previous research has shown that 45% of malpractice claims are due to insufficient and late follow-up of test results and limited communication methods provided to patients. This study explored the preferred communication methods between a patient and a healthcare provider. The technology acceptance model served as the conceptual framework. A quantitative research design was used to examine patients' perceived usefulness, attitude, perceived ease of use, and adaptability regarding mobile technology. The primary means of data collection was the use of a survey questionnaire. Participants included a random sample of 118 women seen in a local health department in the women's clinic and sexually transmitted disease clinic. The research questions focused on exploring test result notification using an electronic mobile device. A chi-squared test was used to answer each research question. The results of the chi-squared analysis revealed no significant association between the use of text messaging and communication with a health provider. There was a significant difference in the mean score in the preferred method of communication of an abnormal test result and a normal test, and that there is not a significant association between the use of a mobile device (IV) and response rate (DV) to test result notification with a health provider. The results from this study offer public health departments a better understand of patients preferred test notification method, which untimely create a positive social change by reducing untreated sexual transmitted diseases.

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Dedication

I dedicate this dissertation to my husband, son, and entire family, who have always encouraged me to follow my dreams and never give up!

Acknowledgments

When I started this journey, I knew it was going to be challenging, but I relied on role models such as my mom, husband, pastor, and special friends to guide me.

To my wonderful husband who has always been my biggest supporter and encouraging me each step of the way to accomplish my goals. My journey has been your journey for the last few years of making sacrifices to ensure my dreams come true.

To my wonderful mother who has always supported my dreams and stepped in to help make my life easier when it got hectic trying to balance, work, family and school. You make me want to be a better person and contribute to making the world a better place.

To my sister, who always remind me how persistence is of virtual when working towards things that may seem to be challenging in life. Keria, I thank you for always telling me how proud you are of me. This gives me the motivation to be the best role model possible for you and others.

To my special friends, for always bringing humor, guidance, and love when I got discouraged and felt like giving up. I appreciate your time, effort and being there during all of my milestones in my life. Most importantly this one!

I would also like to thank Walden University faculty: Dr. Shen. Dr. Root, Dr. McCollum, Dr. Blackmon, and Dr. Richins. This experience has taught me patience and perseverance which have been accompanied by my willingness to accomplish anything I set my mind to.

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Chapter 1: Introduction to the Study

Introduction

Ongoing innovation using mobile technology as a communication method in health care has the potential to enhance patients' experiences, improve research-based treatment, and prevent diseases. In turn, these factors may influence technical aspects of care such as test result notification and may improve diagnosis (Danny, Rylance, & Aduhaimid, 2018). Communication of test results in an appropriate and timely matter is important in rendering high-quality health care (Levit, Balough, Nass, & Ganz, 2013). Studies have addressed racial, gender, and economic factors regarding patients' preferences and satisfaction with different test result notification methods in health care facilities such as nursing care facilities, doctors' offices, and hospitals. However, research addressing patient test result notification using various communication methods in a public health department is limited.

The use of mobile technology is advancing quickly, and society is solidifying it as a potential resolution in the search for a convenient way to communicate health care information (Schooley, Walczak, Hikmet, & Patel, 2016). Technological advancement has presented novel ways of communicating test results, such as health care portals and cell phone devices (Snyder et al., 2011). Patients' perceptions of the use of computers and mobile technology in a health care facility are generally amendable (Sclafani, Tirrell, & Franko, 2013). Electronic health records and health portals are convenient ways for providers to provide patient access to medical records and communicate through messaging (Kruse, Stein, Thomas, & Kaur, 2018). Filkins et al. (2016) discussed many

issues concerning electronic messaging. Disadvantages of using an electronic health care portal are its requirement of access to Wi-Fi or a mobile hotspot and the need for security measures to be maintained until the anticipated end user receives the information. The concern with using a health care portal is the vulnerability of the internet and the possibility of hacking, the leading causes of breaches. Many health care providers have not adopted communication using health care portals or electronic devices due to the difficulties in implementation of safeguards for privacy and security of the internet.

Reed et al. (2014) found that communication using texting notification was significantly higher in women than in men. Fahlman (2013) found that for follow-up appointments and test notification in a private doctor's office, 65% of women prefer to be contacted on their cell phone and 31% by text messaging. Irizarry, DeVito, and Curran (2018) found that patients with economic challenges who had a primary care provider were less interested in using the portal. The use of text messaging provides an opportunity to improve clinical outcomes, health knowledge and behaviors particularly individuals with a sexual transmitted disease (North Carolina Department of Health and Human Services, 2014). A gap exists because researchers have not focused on patients preferred communication method. Due to the increase in text messaging applications, there should be emphasis on addressing the gaps in the knowledge about effectiveness and acceptance of text messaging in health care (NCDHHS, 2014).

According to the Centers for Disease Control and Prevention (CDC (2018), African American women had 548.1 sexually-transmitted disease (STD) cases per 100,000 populations, 8.3 times the rate of Whites. Most women infected with gonorrhea

are asymptomatic; if left untreated, complications can arise from this disease (CDC, 2016). The CDC report showed that females between the ages of 20 and 24 are more likely to test positive for gonorrhea. Among women with a first gonorrhea infection, 14.4% are left untreated (Bautista et al., 2016). The infection can be passed from mother to infant when giving birth, and, if left untreated, gonorrhea increases the risk of acquiring HIV. Additionally, women with untreated gonorrhea can develop pelvic inflammatory disease (PID), which occurs in one in eight women (CDC, 2016). This chapter presents as background a brief survey of the impact of untreated gonorrhea in women, risk factors, communication methods, and the Technology Acceptance Model. Then, the problem statement addresses the intent of the study: to examine if using an alternative communication method to notify patients of test results have an impact on patients' return for treatment. The dependent variable in the study is the response rate, with an independent variable of communication method (i.e., text messaging). This study can contribute to social change by strengthening patient communication capacity and increase access to quality of care to prevent gonorrhea. Better understanding of patients' preferences of communication methods could decrease multiple patient communication attempts and increase the number of women receiving treatment and follow-up by a public health provider. A continued need for research exists despite innovations in mobile health to evaluate the gaps regarding costs, security, and acceptability using mobile technology as a communication method in health care (Danny et al., 2018).

Background of the Study

In the United States, gonorrhea is the second most common disease, with reported cases of 486,514 in 2016 (CDC, 2016). North Carolina ranks sixth among all states in cases of gonorrhea (CDC, 2016). Women who are sexually active, have anal sex, and have unprotected sex are at risk of acquiring gonorrhea (Bazan et al., 2015). Testing for urogenital gonorrhea is common in health care facilities, but testing for rectal gonorrhea is uncommon (Bazan et al., 2015). Gonorrhea can pose a significant threat to women if left untreated (North Carolina Department of Health and Human Services [NCDHHS], 2018). The CDC (2016) recommended that women who have specific risk factors, have multiple partners, or have acquired a new partner be tested annually. Surveillance data showed higher rates of reported sexually transmitted infections (STIs) among African American women compared to rates among Whites (Uhrig, Freidman, Poehlman, Scales, & Forsythe, 2014). The prevalence of STIs among women is not exclusively a result of higher risk tolerance or collective risk behavior (CDC, 2016).

A recent analysis by the CDC (2016) revealed that sexual conduct, condom use, and individual behavior factors do not exclusively influence racial and ethnic differences in rates of STIs. Other factors, such as income inequality, unemployment, low educational attainment, inadequate diagnoses, and poor communication of diagnosis results and treatment options can also influence STI prevalence among populations. These factors disproportionately affect specific age groups, especially among women (Sullivan et al., 2014). People who are financially disadvantaged are often more exposed to life circumstances that could increase their risk for STIs (CDC, 2016). A healthy

lifestyle and positive behavior may be critical in preventing gonorrhea among susceptible groups, and institutional interventions involving communication of test results may be crucial in the reduction of gonorrhea rates among women (Leichliter, Seiler, & Wohlfeiler, 2016).

Regarding different communication methods in health care settings, Gross (2011) identified the benefits of online methods such as electronic health portals and text messages. Gross's findings suggest that women are more comfortable receiving text messages than telephone calls. Hyann, Murray, and Goldbart (2014) also addressed communication using electronic devices among women and found that text messaging was the best communication method due to its ability to allow for communication devoid of social barriers. Shambare, Rugimbana, and Zhowa (2012) also researched the effects of dependency, that is, habitual and addictive use of cell phones among different age groups, genders, and races. De-Sola Gutiérrez, Rodríguez de Fonseca, and Rubio (2016) concluded that the use of cell phones can lead to behavioral changes and addictions such as excessive shopping, searching the internet, and overuse of specific social media platforms such as Facebook. The trends towards widespread of communication using a mobile devices is a global phenomenon (Pew Research Center, 2012). Introduced in the early 2000's, stationary internet has increased to allow digital information connection while on the go (Pew Research Center, 2012). Rapid communication that does not require individuals to communicate simultaneously has many advantages in healthcare (Storck, 2017). Equitable care can be obtained through the use of text messaging (Storck,

2017). Various communication methods in healthcare helps to break down barriers between patients and healthcare providers (Storck, 2017).

Men usually use cell phones for purposes other than communication (for example, to play video games), whereas women are more inclined to use cell phones as a social mechanism for communication (Filkins et al., 2016). According to LaRocque, Davis, Tan, D'Amico, and Merenstein (2015), clients prefer to receive test results via different communication methods. Therefore, knowledge of the overall population's inclinations for methods of correspondence (other than in-person correspondence) for a restorative test is important. McColl, Rideout, Parmar, and Abba-Aji (2014) identified stigma as a factor that prevents young adults from seeking treatment from a public health facility. Communicating by text messaging may provide a more confidential opportunity and help overcome this challenge.

Hall, Zheng, and Dugan (2002) found that recipients open 99% of text messages, and they read 90% of them within 3 minutes of receipt. They also stated that the use of text messaging as a means of communication is convenient and has become one of the most used methods among millions of mobile phone users in America. Communication through text messaging could encourage quick responses and data sharing between health care providers and female patients with STIs. A study by LaRocque et al. (2015) reported that most patients prefer not-in-person methods for test result communication. Ippoliti and L'Engle (2017) analyzed the role of cell phones in transmitting health information and concluded that cell phones have the added advantage of providing links geared toward improving health behaviors among hard-to-reach populations. Although strong

evidence supports the use of electronic communication in health care practices, additional research is needed to establish cost effectiveness, long-term effects, and the value of text messaging as a means of communicating STI test notification and treatment (Gordon & Hornbrook, 2016). It is therefore essential to examine the usefulness of text messaging as an alternative communication method among women in a public health department.

In this study, I examined the use of text messaging as an effective tool for notifying patients of completed gonorrhea test results, patients' response time to the notification, and the facilitation of communication between patients and health professionals at a local health department in North Carolina. This study took into account other demographic factors such as income inequality, educational status, access to a cell phone, correspondent mail, and STI stigmas in the local health department.

Problem Statement

An urgent need exists to sensitize people on safe sex practices and the dangers of untreated gonorrhea, such as the occurrence of PID. Despite the low cost of electronic communication and the array of choices available for communicating test results, health care providers are still not meeting users' preference with regard to diagnoses and test results communication, thereby preventing effective treatment in cases of a positive test outcome (Melissa et al., 2012). According to the CDC (2016), each state must address timely treatment and partner notification of an STI. North Carolina requires public health departments to make only three attempts to contact patients with positive gonorrhea test results, twice via phone call and once by certified mail (NCDHHS, 2018). Observers have noted that the response rates of patients to these calls have been less than

encouraging, and therefore, most patients with positive test results miss out on opportunities to receive treatments (NCDHHS, 2018). The outcome is an increase in cases of untreated gonorrhea carriers who knowingly or unknowingly spread gonorrhea to others (CDC, 2016). The CDC has discussed many other factors involved in STIs. PID causes infertility, ectopic pregnancies, and severe pelvic pain and can be life threatening if the individual develops disseminated gonococcal infection. Treating gonorrhea is imperative because of the rise of drug resistance. Many providers use presumption treatment for gonorrhea, which has been shown to be more accurate in men than women. This study, therefore, aimed to examine other options for test result notification that will encourage better responses from patients who test positive for gonorrhea, with the hope of reducing the incidence of gonorrhea among women.

Purpose of the Study

The purpose of this study was to determine if text messaging is a viable means to improve communication and response rate among women with a positive gonorrhea test result in a local public health department. I aimed to evaluate communication methods for conveying test notification, and to reduce STIs as a public health issue. An improvement in communication can lead to a reduction in gonorrhea (Office of Disease Prevention and Health Promotion [ODPHP], 2019). I identified the factors that influence communication using a mobile application such as text messaging, compared to telephone calls, and the best response communication method for women with a positive communicable disease.

Research Questions

I have based the research questions (RQs) and hypotheses for this study on women's preferred communication method and comfort level with using text messaging as a form of communication. Although many studies have addressed the role of text messaging as a method of communication in health care promotion, little has been written about text messaging as a method of communicating gonorrhea results and treatment options among selected minority groups with a high gonorrhea rate.

RQ1: Is there a significant statistical association between the use of text messaging and effective communication with health care providers?

$H_0$1: There is not a significant statistical association between the use of text messaging and effective communication with health care providers.

H_a1: There is a significant statistical association between the use of text messaging and effective communication with health care providers.

RQ2: Does the adaptability of mobile devices as a means of communication increase patients' response rate to test notification?

$H_0$2: Adaptability of mobile devices as a means of communication will not increase patient's response rate to test notification.

H_a2: Adaptability of mobile devices as a means of communication will increase positive response rate to test notification.

RQ3: Does notification preference vary depending on a normal or abnormal test result among African American women compared to other races?

$H_0$3: Notification preferences will not vary depending on a normal or abnormal

test result.

H_a3: Notification preferences will vary depending on a normal or abnormal test result.

Theoretical Framework

I used the *technology acceptance model* (TAM) to identify the perceived usefulness (PU) and perceived ease of use (PEOU) as it relates to text messaging. The TAM was developed by Davis (1986) to predict how an individual accepts technology in the corporate world. The relationship between perceived usefulness, perceived ease of use, user attitude, and behavior toward adopting technology was identified using TAM. Many researchers in evaluating acceptance and use of new technology consider TAM to be the gold standard. Holden and Rada (2011) stated that TAM could account for 30% to 40% of the variance in a system's usage. The TAM has spread throughout health care, leading in the way providers communicate with patients (Suresh, Prabhakar, Santhanalakshmi, & Maran, 2016). Perceived usefulness and ease of use are determinant depending the incentive of an individual's acceptance and studies has shown that (PEOU), (PU), and trust has a great impact on the acceptance of new technology (Suresh, Prabhakar, Santhanalakshmi, & Maran, 2016). In order to enhance communication methods in healthcare, it is important to understand how patients' communication with healthcare providers and make decisions (Tao, 2008). The PU and PEOU as potential factors is successful adaptation text messaging.

The two specific constructs of the TAM, PU and PEOU, apply when individuals seek to understand the communication initiatives and strategies health providers use to

improve health care. The theoretical relevance of the TAM rests upon the proposition that users' perceptions that text messaging is a preferred means of communication, accompanied by their willingness to adopt this method to receive test result notification, will decrease the spread of gonorrhea.

Nature of the Study

The research population for my study is women age 18–54 who primarily use a cell phone as a communication method. The surveys were administered in a public health department. The survey provided quantitative data on the usability and adaptability of text messaging. The survey was presented at the time of patient check-in via a paper form. The patients completed the survey by the end of their visit and returned it to the registration clerk. The data from the survey was entered into MS Excel and Statistical Package for Social Science (SPSS) was used to analyze the data and associations between variables. The rating scale of questions provided data that was put into categories. The two categories focused on the patient's preferred communication method and comfort level of communication with a health care provider electronically.

Definitions of Terms

Age: Outline of people into various gatherings considering their age with the end goal of computing the well-being status of every gathering (Poorman, Gazmararian, Parker, Yang, & Elon, 2015).

Gonorrhea: A sexually transmitted disease that develops resistance to antibiotic drugs and can infect women and men, commonly between the ages of 15–24 (CDC, 2016).

Pelvic inflammatory disease (PID): PID affects women's reproductive organs and poses a significant concern due to its ability to cause long-term reproductive disabilities (CDC, 2016). An untreated sexually transmitted disease causes PID (CDC, 2016). This disease is common among people with multiple sexual partners and among sexually active youths younger than 25. The use of intrauterine devices (IUDs) has also been reported to promote the occurrence of PIDs (CDC, 2016).

Sexually transmitted infection (STI): STIs usually spread from one person to another when a bacterium, virus, or other parasite enters or comes in contact with the body (CDC, 2016).

Short message service (SMS): SMS, also known as text messaging, involves texting and sending of instant messages. This service allows short instant messages from one wireless device to another or from the web to a mobile device (Advanced Distributed Learning Initiative, 2013).

Technology acceptance model (TAM): The technology acceptance model was defined by Davis (1986). The TAM influential factors often includes a user's perception of the usefulness of the technology, ease of use, and attitude toward new technology.

Assumptions

I assumed that patients would volunteer in the study and be willing to use their cell phones to participate in the study. I also assumed that patients would return the surveys by the end of their visit. Additionally, I assumed that participants who completed the surveys would be both English speaking and non-English speaking. I anticipated the results from the data would encourage health departments to use text messaging as a

communication method to provide prompt notification to patients when test results are available, provide efficient treatment, and possibly reduce the spread of gonorrhea.

Scope and Delimitations

The study could be delimited to the use of text messaging to communicate with patients. This study consisted of a small sample size as a representation of the target population. I anticipated a response rate of at least 80%. There was no effect on the inability to directly and effectively contact participants willing to participate in this study via text messaging. Women of all races participated in the study. Young adults under the age of 18 were excluded from participating. One of the strong points of this study is its comprehensive theoretical base, as shown in the review of related literature on risk factors associated with communicable infections among women and the role of various means of communication in moderating the risk among different age groups. It is within the scope of this study that public health providers educate patients on the importance of responding promptly to a gonorrhea test result. It is not within the scope to cover any data messaging charges the patient may occur due to the use of text messaging.

Limitations

Time constraints, ethical limitations, and the unwillingness of respondents to participate in this study due to the fear of loss of privacy and stigmatization did not limit the amount of data gathered. The registration clerk assisted participants with completing the survey which resulted in 100% completion. Variations in level of education, reading proficiency, and ability to perfectly understand some questions did not result in some participants not providing an accurate view of their communication preference for

gonorrhea test results. There was no limitation in the lack of access to a cell phone with texting capabilities.

Significance of the Study

Patient access to test results is increasing, but limited research exists on patients' preference for receiving test results based on the test conducted. Previous research identified barriers to communication methods between patients and providers (e.g. Mira, Guilabert, Perez-Jover, & Lorenzo, 2014). For many decades, researchers have detected recurrent infections and reduced response rates to positive test results. Many authors have recommended that additional research be done to test the effectiveness of various communication methods, especially the use of text messaging in delivering test results, particularly in clinics serving rural communities. The outcome of this study is a significant benefit to community partners, doctors' offices, and health departments, as it identified a more efficient communication method. Moreover, knowledge of the best method for notification of a communicable disease could eventually help prevent gonorrhea epidemics.

The use of text messaging as an alternative communication method could influence positive social change by allowing patients a more confidential response method, which can increase the response rate to a positive test result. This could encourage women to respond more efficiently when contacted by the health care provider. The study was designed to reduce the number of attempts to contact a patient with a positive gonorrhea test result by using text messaging as the primary communication method.

The social impact of this study could be a benefit to women with a positive communicable disease and an improvement in the response rate with health providers. The provision of other communication options allows women to provide an immediate response to a health provider. Text messaging can provide a more private and confidential way of communicating compared to a verbal response (Schwebel, 2018). This method of communication may encourage women to seek additional concerns related to STIs and prevention. As technology evolves, it is important to explore new ways to communicate and provide other options besides traditional health care, which occurs mainly within an office setting. Many providers are currently using health care portals and Call A Doctor as an electronic means of communication (Miller, Latulipe, Melius, Quandt, & Arcury, 2016). Health care portals allow patients to view test results, and Call A Doctor provides health care in the convenience of the patient's setting (Miller, Latulipe, Melius, Quandt, & Arcury, 2016). Text messaging is a more convenient way to communicate that could limit office visits and cost of medical records test results, and it is a method that will allow a patient the opportunity to receive instant confidential information and notification.

Summary

STIs are transferred from one person to another. Many are curable if treated, but gonorrhea has become more resistant to antibiotics, and women who are exposed to gonorrhea have a higher risk of developing health problems than men (CDC, 2016). The use of mobile technology, especially text messaging, has evolved over the years. Text messaging is one of the promising ways of communication, as it does not rely on fixed

equipment. Text messaging allows immediate communication with patients, delivers preventative health interventions, and promotes a healthy lifestyle (Gold et al., 2011). Chapter 1 provided the premise and background of the research study, an explanation the purpose of this research, and highlights on the need for research about communication methods between health care providers and patients aimed at possibly reducing the spread of gonorrhea. In Chapter 2, I provide literature on gonorrhea among African American women, patient-centered communication, communication methods, sexually transmitted disease treatment barriers, and the technology acceptance model. The literature review will identify the gaps in communication methods between health care providers and patients.

Chapter 2: Literature Review

Introduction

Effective communication in health care settings has a profound effect on treatment outcomes by increasing patient satisfaction, acceptance, compliance, and cooperation. Uhrig et al. (2014) identified poor communication of test results as a major obstacle to the effective treatment of high priority patients with STIs. Numerous empirical studies from several populations and settings have also associated patient retesting and adherence to treatment programs with effective communication of test results. Hence, effective communication of STI test results and an efficient follow-up approach are important for the prevention of the spread of STIs and will help facilitate the treatment of STIs.

Much research has focused on the benefits of empathic and positive communication in health care; however, numerous randomized trials did not have positive findings (Howick et al., 2018). Even with the newest technology using an Electronic Medical Record, normal and abnormal test results are missed. (Shultz, Wu, Matelski, Lu, & Cram, 2015). Mounting evidence has suggested that most infected persons with gonorrhea have never been tested due to privacy concerns and fear of being stigmatized (Melissa et al., 2012). Privacy and confidentiality are essential factors when providing health care services and sharing sensitive information with a patient (NCDHHS, 2018). Studies have identified lack of systems, missed test results, and insufficient mechanisms in advanced electronic health records for ensuring test results are conveyed to patients (Shultz et al., 2015). Further research on the use of text messages

and sensitive clinical information is warranted. The purpose of this study is to identify alternative methods to notify women with positive gonorrhea test results in a public health department.

Literature Review

In this literature review, I explored and examined the use of text messaging as a form of communication in health care and the impact of a positive communicable disease result in women. The literature review helped to assess the need for additional research regarding the use of text messaging in a health care setting and communication methods between patients and health care providers in relation to communicable disease. I conducted the literature review by searching databases through Walden University Library using ProQuest, WHO Global Health Library, Sage, Medline, EBSCO, PubMed, and CINAHL. Key terms and search criteria were *communication, texting, African American women, short text messaging (SMS), mobile technology, gonorrhea, patient-centered care, technology acceptance model,* and *health care provider.* The literature search focused on studies conducted from 2004 to 2018. I used some literature older than 5 years due to limited research in local public health departments regarding patient communication.

In a few studies, researchers applied the TAM in a public health department, especially in STI studies. However, some researchers have conducted studies using the TAM in health care to address the influence of mobile technology in a health care setting. In the literature review, I discuss gonorrhea among African American women and highlight the role of communication, especially test result notification, in addressing this

rising health problem. I also discuss the TAM and various barriers to effective communication in health care, and I attempt to explore different communication methods, including their strengths and weaknesses.

Gonorrhea Among African American Women

Gonorrhea is among the most prevalent STIs in the United States, ranking among the two most commonly reported STIs among women (CDC, 2016). More than 800,000 cases of gonorrhea occur in the United States yearly, and the CDC (2016) reported that gonorrhea has progressively developed resistance to some antibiotics prescribed for its treatment. Antibiotic resistance to gonorrhea treatment is largely responsible for the difficulty in eradicating or controlling the surge of this disease in the United States (NCDHHS, 2018). Gonorrhea infection among African Americans has been found to be more than 10 times higher than among Whites. Furthermore, African American women aged 19–24 are more prone to STI infections than any other age group (CDC, 2016). Public health departments have therefore employed special awareness programs, surveillance, and behavioral intervention schemes to control and prevent the disease, and they encourage gonorrhea testing and treatment among various high-risk groups (CDC, 2016). However, due to health disparities observed in the incidence, prevalence, mortality rate, and related adverse health conditions of this disease among African American women, these intervention efforts are not having sufficient impact. The traditional strategies of sensitization, testing, treatment, and improved communication could go a long way to reduce STIs, especially among African American women.

Patient-Centered Communication

Accessibility of health care and communication is paramount to an effective health care system. Effective communication promotes a patient's privacy and confidentiality, essential factors in providing health care services and sharing sensitive information with patients (Karasz, Eiden, & Bogan, 2013). With regard to STI communication in health care settings, research has shown that the use of technology provides a convenient means for health care providers to access and provide STI test results to patients more effectively (Burnette, 2013). Uhrig et al. (2014) identified poor communication of test results as a major obstacle to the effective treatment of high priority patients with STIs. Numerous empirical studies from several populations and settings have also associated patient retesting and adherence to treatment programs with effective test result communication (Burnette, 2013). Lack of STI testing can have an impact on quality of care, including improper diagnoses and treatment outcomes. Research by Gross (2011) demonstrated the effectiveness of using a mobile device as an alternative to mail. Additionally, mobile devices are personal and generally not shared, which makes it more acceptable to communicate health details using this method. McColl et al. (2014) examined the cost effectiveness of using an electronic device compared to mail and identified the use of a smartphone as being more effective than mail. McColl et al. also identified the use of a mobile device as the most effective communication method that allows individuals to communicate openly. Hence, effective communication of STI test results and an efficient follow-up approach are important for the prevention of the spread of STIs and will help facilitate the treatment of STIs. Test results in health care

settings are not always communicated clearly to patients. In a study conducted in four practices, patients were told to contact the practice within a set time; normal results required no further action (Litchfield, Bentham, Lilford, & Greenfield, 2014). However, the authors noted that the clinic advised patients with positive test results to make appointments, and, in some cases, health care providers followed up with patients. They concluded that there are differences in health care practices and communication methods available to notify a patient of an abnormal test result. Due to sensitive information and newer communication methods, providers permit alternative delivery methods (LaRocque et al., 2015).

Communication Methods

Effective communication methods are the foundation of successful patient–provider interaction. This dynamic relies on trust, patient-preferred communication, and timely provider follow-up with patient test results (LaRocque et al., 2015). LaRocque et al. (2015) found that 50% of patients were comfortable with receiving STI test results through methods that did not require receiving them from the testing centers in person, and that receiving information via fax was the least preferred method of communication by patients. The patient comfort level regarding receipt of test results showed a statistical difference depending on whether the test results were provided via voicemail, fax, personal email, mobile text message, or password-protected websites.

New electronic technology has provided new ways for patients to become involved in receiving health care information and test results. The use of a health care portal allows patients to directly monitor health care information and allows providers to

remotely deliver instructions, education, and test results (Litchfield et al., 2014). Zhao and Wei (2016) examined how the use of an electronic device in a health care setting can influence behavior changes. Zhao and Wei (2016) found that the most behavior changes among participants were monitored by self-evaluation features of using a mobile app. Due to a user-friendly design, benefits of the mobile app included improved involvement of the health care professional, provision of detailed information to the patient, and immediate feedback (Boulous, Brewer, Karimkhani, Buller & Dullavalle, 2014). The use of a telephone to communicate can relay real-time responses and asynchronous exchanges with health care providers. The use of electronic technology has several advantages for providing test result notification.

A study conducted by a team at Columbia University compared different technology and ease of use by young adults (Safran & Muran, 2011). Technology included telephone, texting, email, face-to-face, and social media. The participants rated face-to-face and telephone as the most intimate forms of communication and most related to their feeling of being understood (Safran & Muran, 2011). Despite these findings, the preferred form of communication was text messaging (Safran & Muran, 2011).

The use of text messaging as a method of communicating test results could translate into opportunities for health care providers to improve efficiency (Forgays, Hyman, & Schreiber, 2014). Text messaging can allow individuals at work to communicate with a health care provider privately and nonverbally. This can allow more individuals to feel more comfortable with communication. The use of text messaging in public health is not new, and public emergency preparedness, physical activities, smoking

cessation, behavior promotion, appointment reminders, and other health prevention programs use it, but there is minimal use in public health departments (Karasz, Eiden, & Bogan, 2013).

The Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule (NCDHHS, 2018) requires health care organizations to implement security measures to provide physical and technical safeguards regarding a client's personal health information (PHI). NCDHHS (2018) recommends the elimination of personal identifiers such as date of birth, address, or social security number when using text messaging about health information. Another NCDHHS recommendation is compliance with the security rule of the individual state laws that permit texting as a form of communication.

Sexually Transmitted Disease Treatment Barriers

STIs are one of the main health problems seen in local health departments, especially among young adults from minority groups (CDC, 2016). Untreated STIs could potentially contribute to the spread of HIV, PID, premature births, ectopic pregnancy, and infertility and could lead to certain forms of cancer. Prevention and treatment efforts aimed at interfering with the spread of STIs are dependent on the identification and elimination of barriers to accessible STI services (CDC, 2016). Research on barriers to STI services has identified system-level barriers, societal barriers, and interpersonal barriers to effective treatment and control of STIs (Tilson et al., 2004). System-level barriers include inefficient test result dissemination methods, long waiting hours, cost, and inconvenient clinic hours. Cost of treatment, discrimination, inconvenient clinic hours and specimen collection methods, are also barriers at system levels that can affect

communication and treatment of STIs (Parrish & Kent, 2008). Peralta, Deeds, Hipszer, and Ghalib (2015) examined barriers and factors that encourage HIV testing among adolescents. Study respondents unanimously agreed that STI testing in which confidentiality and quick response are certain would encourage them to obtain HIV testing services. This finding highlights the role of proper test result dissemination in STI treatment and prevention. Tilson et al. (2004) organized a focus group that examined obstacles to effective screening and rendering of other STI services among White, Latino, and African American participants. Findings from this group forum identified long waiting hours as a major obstacle to STI testing and treatment Tilson et al. (2004). Infected individuals that receive testing and treatment limits the harm and reduces the spread of the disease (Denison, Bromhead, Grainger, Dennison & Jutel, 2018). Regular STI testing is recommended for all individuals that are sexually active (CDC, 2016).

According to NCDHHS (2018), North Carolina requires communicable disease reporting. Providers must report communicable diseases such as chlamydia and gonorrhea to NCDHHS within 7 days. Fear and stigmas associated with STIs are societal barriers that debilitate effective STI communication and treatment. Tilson et al. (2004) conducted a focus group recruited from nonmedical experts to learn and understand more about communication barriers and ways to improve care for individuals who tested positive for an STI. Findings from this focus group indicated that screening for, or being diagnosed with, an STI is often associated with humiliation, stigma, and unease. According to Swenson et al. (2009), most women may prefer to speak to a female rather than a male health care provider about test results and testing for STIs due to stigma.

Women also may have misconceptions about the STI testing process. Normalizing the sexual health conversation may help reduce the stigma surrounding STI communication and treatment. There are barriers accessing STI prevention and management services (Denison, Bromhead, Grainger, Dennison & Jutel, 2018). Health care providers need to identify the barriers that prevent testing and encourage all individuals that are sexually active (Denison, Bromhead, Grainger, Dennison & Jutel, 2018).

According to Urganci, De Jongh, Vodopivec-Jamsek, and Atun (2012), communication using postal mail is considered slow and can take up to 2 days for the recipient to receive the mail. Privacy and confidentiality are high due to the personal address, the cost can be moderate, and delivery confirmation can be expensive. Urganic et al. noted that telephone calls to a fixed line are considered immediate only if the person answers the telephone; privacy and confidentiality are low, as this method prevents a health care provider from leaving detailed messages; there is no delivery confirmation if no one answers the phone; and the cost is considered low. The researchers found that texting to mobile phone has a higher probability than a fixed line of receiving an immediate response, the confidentiality enables the possibility for a message to be left, and the delivery confirmation is not necessary if someone answers a phone call.

Melissa et al. (2012) found that individuals use their cell phones to obtain health care information, as it enables them to receive information in private without being overheard. Additionally, the use of text messaging reduces barriers of confidentiality, privacy and inconvenience, as individuals can respond when they have time as opposed to a received telephone call. The fast and convenience of text messaging is appealing to

patients (Smith, 2015). There is no learning curve and minimum efforts to utilize test messaging (Smith, 2015). The use of text messaging can offer an additional form of patient and provider communication.

The state has mandated public health departments to control, prevent, and report infectious diseases (CDC, 2016). In North Carolina, health providers, school administrators, medical facilities, restaurants, and child care facilities must report all communicable diseases to their local health department by mail, telephone call, and North Carolina Disease Surveillance System (NCDDS) electronic reporting (NCDHHS, 2018). In turn, the local health departments report these diseases to the North Carolina Division of Public Health (CDC, 2016). According to NCDHHS (2018), communicable diseases such as gonorrhea and chlamydia must be reported within 7 days of the clinic receiving positive results.

Siedner et al. (2015) found that females were interested in receiving health information by text messaging to reduce transportation cost, and they would not be concerned with personal health information being disclosed accidentally. Electronic communication has evolved over the past decade which means there is opportunities to provide health education, test result notification and appointment reminders (Karasz, Eiden, Bogan, 2013). Text messaging as a communication method can be used from any location and convenient for the patient and physician (Bishop, Press, Mendelsohn, & Casalino, 2013). Patient center care implies that electronic communication should be used more extensively to substitute communicating by mail or telephone when appropriate (Bishop, Press, Mendelsohn, & Casalino, 2013).

Technology Acceptance Model

With advanced technology and needs for consumer convenience, researchers have developed various technology acceptance models (Lai, 2017). Over the years, researchers have used technology acceptance models to display an individual's acceptance and intended use of new technology. Created in 1989, the TAM is designed to identify the user's intent to develop new skills and adapt to new technology (Davis, 1986). Researchers identify perceived usefulness in the TAM model by how easy the electronic system would be to the employees. Davis conducted two studies that reached 152 users and four programs, and that achieved validity and reliability. Researchers have used different models to evaluate the use of technology. However, the TAM is one of the most commonly used models to address the acceptance of technology and identify the attributes of users (Durodolu, 2016). Durodolu found that extrinsic and intrinsic motivation can affect adaptability to new technology. An array of social factors notwithstanding race exists, including sex, age, education, social class, and the desires that guide the therapeutic relationship between a patient and a provider. Durodolu noted that some researchers have argued that communication and trust with a physician are the basis of patients seeking treatment or health care services. The technology acceptance model provides a framework for the patient's perceived usefulness, attitude, behavior, and adaptability. TAM is a popular model that addresses why users accept or reject technology. The *theory of reasoned action* (TRA), based on Fishbein and Ajzen (2010), suggests that a person's attitude and subjective norms are dependent upon behavioral intention (BI). To examine the role of motivation, perception, and a person's thoughts,

researchers have incorporated behavioral theory models with technology models (Tsai, 2014). The hypothesis in the current study is that the TAM model displayed in Figure 1 will support the proposition that text messaging is a comfortable and preferred communication method compared to other communication methods.

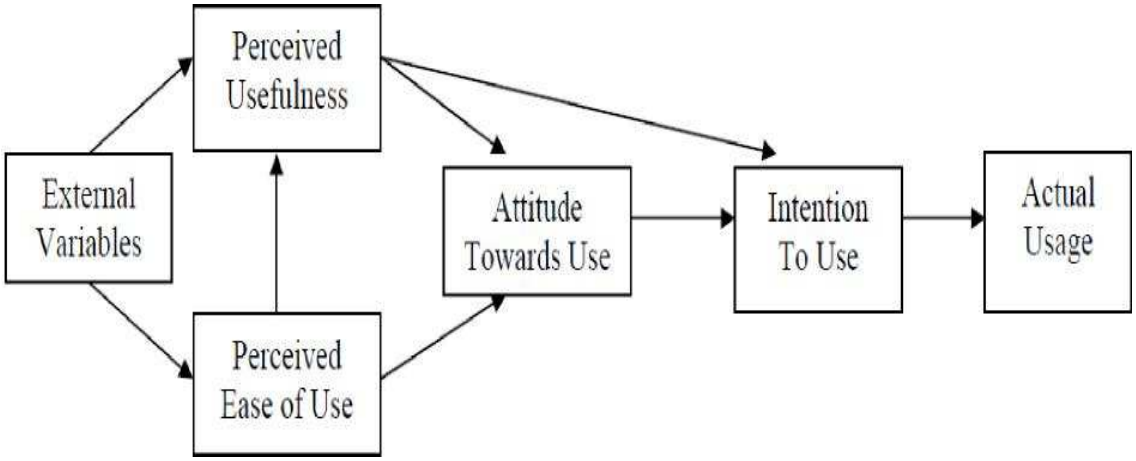

Figure 1. First modified version of Technology Acceptance Model (Davis, Bogozzi, & Warshaw, 1989). Adapted from "The Literature Review of Technology Adoption Models and Theories for the Novelty Technology," by P. C. Lai, 2017, *Journal of Information Systems and Technology Management, 14,* p. 7. doi:10.4301/S1807-17752017000100002 Reprinted with permission.

Durodolu's study (2016) measured the usefulness of technology by using the TAM survey and found that out of 101 participants, 53% perceived usefulness of technology. This study identified the effortless use of technology to predict if patients would adapt to the use of an electronic health care device. The model provided reliable and valid results in relation to the participants and the use of technology. According to Wallace and Sheetz (2013), mobile technology used in a health care setting reduces the treatment period, enables patients to retrieve medical records, and reduces malpractice.

Cole-Lewis and Kershaw (2011) conducted 12 randomized controlled intervention trials for disease deterrence and management using text messaging in a

health care setting. The study found that behavioral outcomes were highest among minorities, adolescents, and adults. The evidence demonstrated that text messaging is a valuable tool for disease prevention, communication, and management. Additionally, the most effective mobile technology as perceived by patients may differ. According to Sun, Wang, & Pen (2013), the perceived ease of use is a strong variable that influences adaptability in patients, although it may not be as strong with health care providers. Using the TAM, Maeder and Martin-Sanchez (2012) found that patients prefer to use an electronic system to make appointments and communicate with health care providers. The authors recommended that perceived usefulness and perceived ease of use be used to allow patients to communicate using a mobile phone to receive text messages, access a health care portal, or receive information from a provider.

Krist et al. (2014) found in using the TAM with patients aged 18 to 75 that they were willing to use a mobile device to communicate with a health care provider and receive notification of test results. The study indicated that during the first month of implementing a new communication method for patients, the rate of use increased by 25.6% for patients who adopted an electronic form of communication using the health care portal. Factors that influence adopting are race and type of visit. African Americans and Hispanics were the least frequent to adopt this communication method, although previous studies indicated that the adoption of new technology as a form of communication with a provider was digitally divided (Krist et al., 2014). Krist et al. stated that future studies are needed to track the influence of using a mobile device as it

relates to race, ethnicity, demographics, and patient engagement, and also to determine whether patients are willing to use an electronic device to receive health care information.

Venkatesh and Davis (2000) developed a new version of the TAM and found the perceived usefulness and perceived ease of use had a direct influence on behavior intention, eliminating attitude toward use.

The TAM model will help identify user's adaptability and ease of using text messaging as a means of communicating with a public health provider. The purpose of using TAM in this study is to present the impact of external variables on women's attitudes, beliefs, adaptability, mindset, and intention to use text messaging as a form of communication with a health care provider.

Summary

In public health departments, timely and appropriate communication of test results is vital so that patients can make decisions regarding their health care. Ways of notifying patients of test results and providing education and appointment reminders are evolving. Text messaging as a form of communication in a public health department can potentially be a potent tool for behavioral changes, as it is inexpensive, offers instant communication, and is a confidential and widely available tool. In Chapter 2, I discussed the literature on various means of communication in a health care setting, communication barriers, and gonorrhea among women. Chapter 3 will identify and explain the choice of the methodology used in this study and will also explain the research framework, procedures, and choice of data analysis techniques.

Chapter 3: Methodology

Introduction

In this section, I describe the techniques and procedures used in this study as well as the rationale for my choice of research method. I also describe types of data collected, how and where they were collected, data analysis, sampling process, and sampling procedures. In choosing an appropriate method for this study, I drew from Denscombe (2010), who posited that effective research should (a) relate to the purpose of the study, (b) be effectively piloted, and (c) consider the limitations of time. In addition, Denscombe noted that in a feasible study, researchers should consider available resources, apply sound ethical practices, and address the study's research questions. The study focused on the base TAM model developed by Davis (1986), although several other TAMs were reviewed: Davis (1986), and Venkatesh and Morris's (2000) theory of reasoned action (TRA). I used the basic TAM model, as it is specifically tailored to an individual's use and acceptance of the technology. The purpose of this study was to discover patient test notification preference. In this chapter, I will describe the study's research design and data analysis according to institutional review board (IRB) approval. I examined the extent to which the use of text messaging can improve communication between a public health department and African American women with a positive gonorrhea diagnosis.

Research Questions and Hypotheses

In this study, I addressed the following questions:

RQ1: Is there a significant statistical association between the use of text messaging and effective communication with health care providers?

$H_0$1: There is a significant statistical association between the use of text messaging and effective communication with health care providers.

H_a1: There is not a significant statistical association between the use of text messaging and effective communication with health care providers.

RQ2: Does the adaptability of mobile devices as a means of communication increase patients' response rate to test notification?

$H_0$2: Adaptability of mobile devices as a means of communication will increase patient's response rate to test notification.

H_a2: Adaptability of mobile devices as a means of communication will not increase positive response rate to test notification.

RQ3: Does notification preference vary depending on a normal or abnormal test result among African American women compared to other races?

$H_0$3: Notification preferences will vary depending on a normal or abnormal test result.

H_a3: Notification preferences will not vary depending on a normal or abnormal test result.

Research Design

The approach used in this study was a quantitative correlational method. The concepts include effective communication, factors influencing effective communication in health care, the idea of personal preference, and attitudes toward test result communication. I collected all data using a survey that predicated my research design in this study. To discover the relationship between the independent variable and dependent variable, I used a multivariate binary logistic regression to identify any relationship between the motivation and acceptance to communicate using text messaging.

The survey used in the study examined patients' preferences for notification of their test results. Data collection included demographics (age, race) and educational attainment. The objective of the study was to identify women's preferred communication method. To assist with emotional impact, two tests were selected: normal emotional impact (normal gonorrhea test result) and high impact (abnormal gonorrhea test result). The full survey instrument is included as Appendix B.

Author's Permission

The Patient Preferences for Test Result Notification Survey, the tool I used for the study, is public domain and does not require permission to implement during research.

Methodology

I used quantitative research to build knowledge, collect data, formulate hypotheses, and develop measures (see Corner, 2002). The use of TAM, either directly or indirectly, affects the intentions of usefulness or ease of use (Davis, 1986). Other models, such as TRA, refer to a person's independently affected intentions only (Burton-Jones &

Hubona, 2006). The focus on TAM is based on the perceived ease of use and acceptance of using text messaging as a communication method. The effects on the external variables, such as cell phone texting capabilities, was the focus within TAM. Cases that conform to a designated set of specifications in a research study make up a population (Frankfort-Nachmias & Nachmias, 2008). The population in the study consisted of all women seen in the Women's Clinic and STD clinic with access to a cell phone with texting capabilities. The focus population was African American women. The setting for this study was a local health department in North Carolina.

I analyzed the sample size by using the G*Power analysis software (Faul, Edrfelder, Buchner, & Lang, 2009). In order to find the minimum R^2, power (1-β err prob), 0.80 was used to identify the statistically significant alpha level of 0.05 (α =.05) and minimum effect size. The sample size required using this formula is a minimum of 43 completed surveys. A total number of 118 surveys was collected. I entered the data collected by surveys into MS Excel (Windows 10) and transcribed it in the Statistical Package 24 (SPSS), Windows version 10 (Microsoft, 2016). I generated the SPSS data output by performing a Chi-Square and Fisher exact. I used SPSS to assess the connection between the variables. I used parametric approaches such as pie charts, bar charts, and histograms to interpret results.

Data Analysis

A research strategy, as described by Biggam (2011), is a methodical process, design, and procedure employed in conducting research. This strategy explains how a researcher proposes to go about answering the study's research questions. Fisher (1936)

introduced linear discriminant analysis (DA), and Huberty and Olejnik (2006) later discussed a multivariate technique that classifies individuals into groups (predictive discriminant analysis; PDA). Lix and Sajobi (2010) described the group differences (descriptive discriminant analysis; DDA). I used a Chi-Square to identify the similarities and differences between women who prefer texting versus those who prefer telephone calls, and how demographics and normal or abnormal notification may influence the individuals' communication preference. There was no difference in communication preference between older adults and younger ones, who are often more technology savvy than older adults.

Factors such as response rate, cost, and time influenced the survey method I chose for collecting data from the participants. The consent form supported the goal of anonymity, which encouraged more participants in this research, and was indicated at the top of the survey to be filled by willing participants of this study. This study was conducted among patients age 18 to 54 in a local public health department.

Sampling and Procedures

Quantitative studies use sampling approaches such as random sampling, stratified sampling, and systematic sampling (Green and Salkind, 2014). I used a 9-point Likert scale to analyze the attitude and motivation of participants toward using a mobile device to communicate with a health care provider (Rosen, Whaling, Carrier, Cheever, & Rokkum, 2013). According to Elfil and Negida (2017), simple random sampling is a preferable technique that represents every possible combination of cases and population. The aim and objective of analyzing a population is to identify an adequate sample size.

To satisfy true randomness in the selection process, random sampling is the most appropriate technique for this study. Participants consisted of women aged 18-54, of different races and education levels, with a focus on African American.

Participants

Participants consisted of women seen at a local health department. The surveys was dispersed at the beginning of the visit and participants were instructed to complete the survey by the end of the visit. Registration clerks were available to assist participates that needed assistance completing the survey. The registration clerks advised the participants that the survey is anonymous and for research purposes only.

Patient Recruitment and Data Collection

Women seen in a local health department aged 18 to 54 who owned a mobile device were candidates for this study. The registration clerk introduced the research study during patient check-in. Upon their approval to participate in the study, participants was asked to complete a survey that included consent to participate. I obtained permission from copyright holders (see Appendix A). The participants were instructed after they have completed the survey to place it in a lockbox. The surveys were at the end of each business day. There was no incentives offered for completing the survey. All survey results were into a computer that saved the data and a quantitative analysis was conducted.

Threats to Validity

The selected group sample may influence the outcome of the research study. Threats in this study may be the provision of the option to participants to return the

survey at the end of the visit instead of the beginning, during the registration process. Another threat to the study is that the demographic questions may be inconclusive. The surveys will be distributed in multiple clinics that have unpredictable appointment schedules; this may be a threat to patient demographics and response rate. I do not anticipate the participant's access or ownership of a cell phone to be a threat. The study is not designed to determine cause and effect; the relationship between variables can be interpreted (Gast & Ledford, 2014). Select biases can contribute to threats in internal validity. The selection of the specific age group 18–54 and African American women is an attempt to control threats to internal validity. Participants may become fatigued when answering a lot of questions, which may affect internal validity (Egleston, Miller, & Meropol, 2011). I assume construct validity to be high because I will measure the variables in this study using Survey Monkey. Construct validity is how much a test measures what it claims, or indicates what it measures (Moss, 1998). The use of random sampling may have an impact on the number of African American participants to complete the surveys.

Revisions of the Survey

The patient preferences for the test result notification survey were adapted from surveys that sampled an adult population that focused on specific tests: DXA scan, herpes, and cancer (Shultz et al., 2015). The study will be conducted at a local health department that provides Pap smears and testing for gonorrhea, chlamydia, herpes, HIV, and tuberculosis. However, due to the nature of this study, the survey will focus on only gonorrhea testing.

Ethical Procedures

I will conduct the study in compliance with Walden University ethical standards and the HIPAA and confidentiality policies of the local health department. I will fully inform participants about the purpose of the study and present them with a consent form and all elements required by Walden University, IRB, and the public health department. Each participant will have the option to complete the questionnaire in the exam room. This will ensure that participants can complete the questionnaire in a private setting. Once the questionnaires are completed, they will be placed in a locked box, which will be collected at the end of each business day by the researcher. Participants who do not complete the consent form will not be allowed to complete the questionnaire. Participants will also be informed that there will be no compensation for completing the questionnaire, and participation is voluntary only.

Summary

Chapter 3 described the methodology, approaches to data collection, and analysis using a survey. Ethical procedures discussed included how data will be collected confidentially and securely. I will discuss the patient notification test results and survey results, including evaluation, data analysis, future research implications, limitations, and strengths in Chapter 4.

Chapter 4: Results

Introduction

The purpose of this study was to investigate whether text messaging is a preferred notification method for test results compared to mail, phone call, social media, or health care portal in a local health department. In this study, I also investigated whether patients with either an abnormal or normal test result preferred to be notified using the same communication method. The research questions focused on patients' preferred communication method, the adaptability, and notification preference communicating with a health care provider. The first null hypothesis was as follows: There is not a significant statistical association between the use of text messaging and effective communication with health care providers. The second null hypothesis was as follows: Adaptability of mobile devices as a means of communication will not increase positive response rate to test notification. The third null hypothesis was as follows: Notification preferences will not vary depending on a normal or abnormal test result.

The technology acceptance model was applied to the study to offer a theoretical method for evaluating the perceived usefulness, acceptance, and ease of use of mobile technology. Surveys were used to identify patients' perceptions and attitude toward communication using an electronic device. The answers to the study's research questions are summarized and reported in a conclusion on the preferred test result notification method.

The following null hypotheses were tested in this study and evaluated against a 5% level of significance (i.e., *p*-value):

$H_0$1: There is not a significant statistical association between the use of text messaging and effective communication with health care providers.

$H_0$2: Adaptability of mobile devices as a means of communication will not increase positive response rate to test notification.

$H_0$3: Notification preferences will not vary depending on a normal or abnormal test result.

This chapter will provide the results on the data collection process, sample size, statistics, and statistical analysis findings of the surveys using SPSS statistical software.

Data Collection

The collection process was approved by the local health department and Walden University IRB (# 05-07-19-0413331). The agency data were collected in the women's clinic and STI clinic in a local health department. The registration staff in each clinic administered the surveys, as described in Chapter 3. Part 1 of the survey collected patient demographic information and texting capabilities, primarily use of a cell phone and education level. Part 2, consisting of four questions, measured the patients' comfort level with test result notification using text messaging, mail, telephone call, web portal, office visit, or email. The survey included the purpose of the study, consent, and instructions.

During the data collection process, no major problems occurred. The registration clerks reviewed each survey to ensure it was completed in its entirety. This resulted in a 100% response completion and a response rate of 95% *(n* = 118). The women's clinic returned 36 surveys and the STI clinic returned 82 surveys. I was able to obtain 118

samples to meet the requirement of the power analysis. The data used in the study were provided by the local health department. I entered the data into SPSS for analysis.

Data Analysis Results

The demographic variables collected were age, race, and educational level of the participants. I used frequency distribution to summarize the demographics in Tables 1–3. The results indicated that the greatest number of participants in the women's clinic were aged 18–27 (58.3%). The STI clinic had 82 participants, with most aged 18–27 (59.8%). Most participants in the women's clinic were Hispanic 18 (50.0%) and in the STI clinic, African American, 53 (64.6%). Participants' highest education levels in the women's clinic were high school, 14 (38.9%); STI clinic, were college, 40 (48.8%); shown in Tables 1–13.

Table 1

Distribution of Age

Clinic	Age (years)	Frequency	Percentage
Women's clinic	18-27	21	58.3
	28-36	7	19.4
	37-44	6	16.7
	45-54	2	5.6
	Total	36	59.8
STI clinic	18-27	49	59.8
	28-36	18	22.0
	37-44	9	11.0
	45-54	6	7.3
	Total	82	100.0

Table 2

Distribution of Race

Clinic	Race	Frequency	Percentage
Women's clinic	African American	11	30.6
	White	7	19.4
	Hispanic	18	50.0
	Other	0	0
	Total	36	100.0
STI clinic	African American	53	64.6
	White	15	18.3
	Hispanic	10	12.2
	Other	4	4.9
	Total	82	100.0

Table 3

Distribution of Education

Clinic	Education	Frequency	Percentage
Women's clinic	High school diploma	14	38.8
	Some high school	10	27.8
	Some college	10	27.8
	College graduate	2	5.6
	Total	36	100.00
STI clinic	High school diploma	18	22.0
	Some high school	11	13.4
	Some college	40	48.8
	College graduate	13	15.8
	Total	82	100.00

Table 4 summarizes participants who own a cell phone.

Table 4

Participants Who Own a Cell Phone

Clinic	Own	Frequency	Percentage
Women's clinic	Yes	35	97.2
	No	1	2.8
	Total	36	100.00
STI clinic	Yes	78	95.1
	No	4	4.9
	Total	82	100.00

Table 5 summarizes the primary method of communication. The primary method of communication was used to answer Research Question 1.

Table 5

Preferred Communication Method

Clinic	Communication method	Frequency	Percentage
Women's clinic	Texting	24	66.7
	Calling	10	27.8
	Social media	2	5.6
	Total	36	100.0
STI clinic	Texting	63	76.8
	Calling	17	20.7
	Social media	2	2.4
	Total	82	100.0

Survey Question 8 used a 4-point Likert scale to indicate how likely it is that patients will respond when contacted by a health care provider using the following: text messaging, telephone call, mail, and health care portal: 0, *very likely*; 1, *likely*; 2, *not*

likely; 3, *not at all*. Tables 6–9 illustrate how likely it is that patients will respond. Results from these items were used to answer Research Question 1.

Table 6

Response Rate (Text Messaging)

Clinic	Response	Frequency	Percent
Women's clinic	Not at all	0	0
	Not likely	3	8.3
	Likely	10	27.8
	Very likely	23	63.9
	Total	36	100.0
STI clinic	Not at all	6	7.3
	Not likely	4	4.9
	Likely	22	26.8
	Very likely	50	61.0
	Total	82	100.0

Table 7

Response Rate (Telephone)

Clinic	Response	Frequency	Percent
Women's clinic	Not at all	0	0
	Not likely	3	8.3
	Likely	12	33.4
	Very likely	21	58.3
	Total	36	100.0
STI clinic	Not at all	1	1.2
	Not likely	1	1.2
	Likely	20	24.4
	Very likely	60	73.2
	Total	82	100.0

Table 8

Response Rate (Mail)

Clinic	Response	Frequency	Percent
Women's clinic	Not at all	4	11.1
	Not likely	12	33.3
	Likely	10	27.8
	Very likely	10	27.8
	Total	36	100.0
STI clinic	Not at all	13	15.9
	Not likely	21	25.6
	Likely	27	32.9
	Very likely	21	25.6
	Total	82	100.0

Table 9

Reponses Rate (Health Care Portal)

Clinic	Response	Frequency	Percent
Women's clinic	Not at all	2	5.6
	Not likely	11	30.6
	Likely	13	36.0
	Very likely	10	27.8
	Total	36	100.0
STI clinic	Not at all	7	8.5
	Not likely	18	22.0
	Likely	33	40.2
	Very likely	24	29.3
	Total	82	100.0

Survey Question 9 used a 4-point Likert scale to indicate comfort level communicating with a health care provider using the following: text messaging, telephone call, mail, and health care portal: 0, *very comfortable*; 1, *comfortable*; 2, *somewhat comfortable*; 3*, not comfortable*. Tables 10–14 depict the patient's comfort

level communicating with a health care provider. Results from these items were used to answer Research Question 1.

Table 10

Comfort Level (Text Messaging)

Clinic	Comfort level	Frequency	Percent
Women's clinic	Not comfortable	1	2.8
	Somewhat comfortable	5	13.9
	Comfortable	14	38.9
	Very comfortable	16	44.4
	Total	36	100.0
STI clinic	Not comfortable	12	14.6
	Somewhat comfortable	11	13.4
	Comfortable	27	32.9
	Very comfortable	32	39.1
	Total	82	100.0

Table 11

Comfort Level (Cell Phone)

Clinic	Comfort level	Frequency	Percent
Women's clinic	Not comfortable	0	0.0
	Somewhat comfortable	0	0.0
	Comfortable	15	41.7
	Very comfortable	21	58.3
	Total	36	100.0
STI clinic	Not comfortable	0	0.0
	Somewhat comfortable	5	6.1
	Comfortable	28	34.1
	Very comfortable	49	59.8
	Total	82	100.0

Table 12

Comfort Level (Health Care Portal)

Clinic	Comfort level	Frequency	Percent
Women's clinic	Not comfortable	4	11.1
	Somewhat comfortable	7	19.4
	Comfortable	16	44.4
	Very comfortable	9	25.1
	Total	36	100.0
STI clinic	Not comfortable	7	8.5
	Somewhat comfortable	18	22.0
	Comfortable	34	41.5
	Very comfortable	23	28.0
	Total	82	100.0

Results of Statistical Analysis

I used chi-squared, Fisher's Exact Test, to examine each hypothesis and answer the research questions. This method enabled the objective of identifying patients' preferred communication method with a health care provider.

RQ1: Is there a significant statistical association between the use of text messaging and effective communication with health care providers?

$H_0$1: There is a significant statistical association between the use of text messaging and effective communication with health care providers.

H_a1: There is not a significant statistical association between the use of text messaging and effective communication with health care providers.

In RQ1, the test was performed to examine the association between text messaging and comfort level communicating with a health care provider using a mobile device. Ninety-five percent of the participants owned a cell phone. The results of the chi-squared analysis revealed no significant association between the use of text messaging

and communication with a health provider: X^2 (6, N = 118) = 6.9, p = .26. Thus, the null hypothesis that there is not a significant statistical association between the use of text messaging and effective communication with a health care provider cannot be rejected.

Table 13

Cross Tabulation and Fisher's Exact Test of Preferred Notification Method and Comfort Level

Preferred communication method								
	Not comfortable	Somewhat comfortable	Comfortable	Very comfortable	Total	x²	df	p
Texting	9	10	30	38	87	6.9	6	.26
Calling	3	4	11	9	27			
Social media	1	2	0	1	4			
Total	13	16	41	48	118			

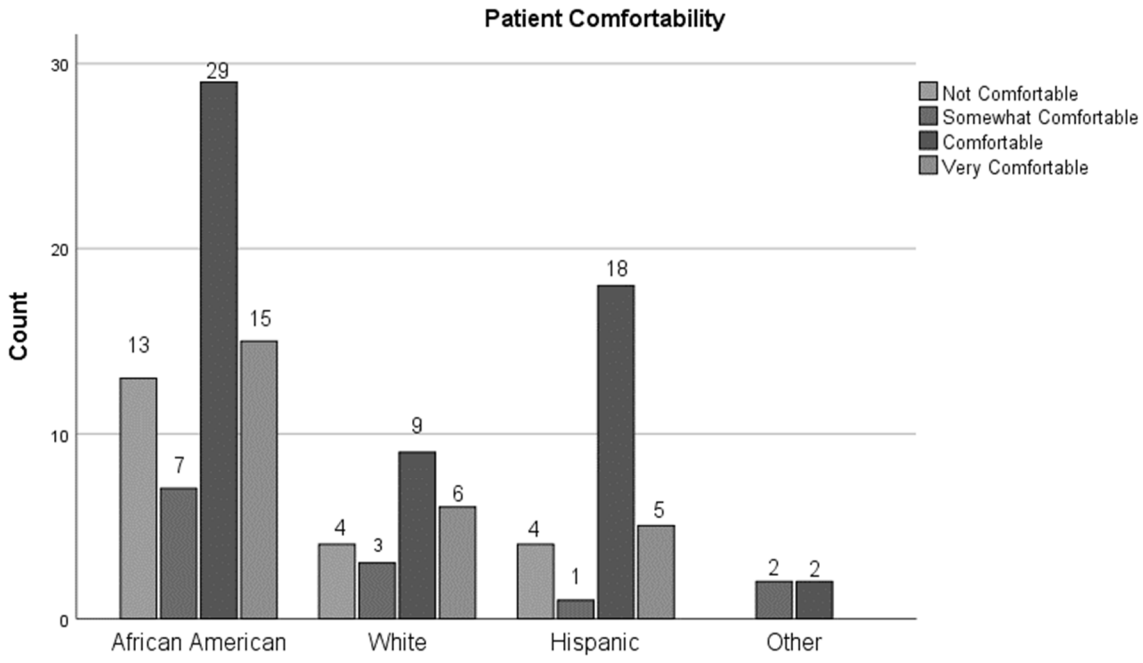

Figure 2. Graph for patient comfort level communicating with health care provider.

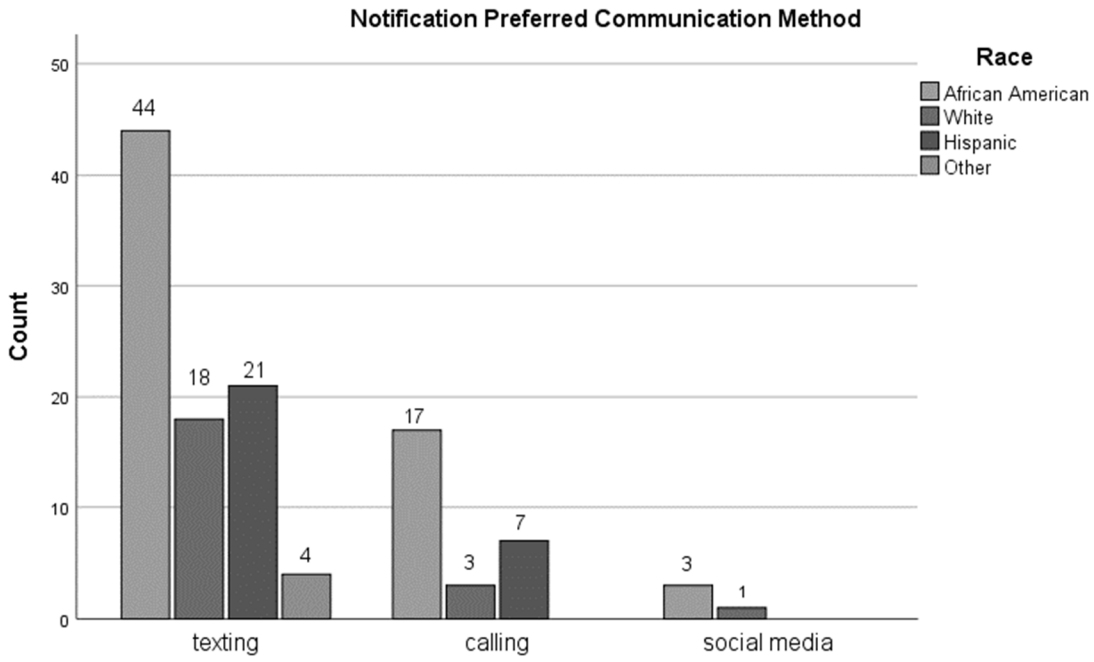

Figure 3. Graph of patient-preferred communication method

Research Question 2: Does the adaptability of mobile devices as a means of communication increase patients' response rate to text notification?

$H_0$2: Adaptability of mobile devices as a means of communication will not increase patients' response rate to text notification.

H_a2: Adaptability of mobile devices as a means of communication will increase positive response rate to text notification.

In RQ2, the test was performed to examine the association between response rate and use of a mobile device. The results of the chi-squared analysis revealed that there is not a significant association between the use of a mobile device (IV) and response rate (DV) to test result notification with a health provider: X^2 (6, N = 118) = 7.4, p = .21. Thus, I conclude that there is not a statistically significant association between using a

mobile device compared to mail and the likelihood patients will respond if notified by text messaging. The null hypothesis that adaptability of mobile devices as a means of communication will not increase patient's response rate to text notification is accepted. Table 14 shows the adaptability to a mobile device and the response rate communicating with a health care provider.

Table 14

Cross Tabulation and Fisher's Exact Test of Preferred Notification Method and Response Rate

Response rate								
	Not at all	Not likely	Likely	Very likely	Total	x^2	df	p
Texting	5	3	21	58	87	7.4	6	.21
Calling	1	4	9	13	27			
Social media	0	0	2	2	4			
Total	6	7	32	73	118			

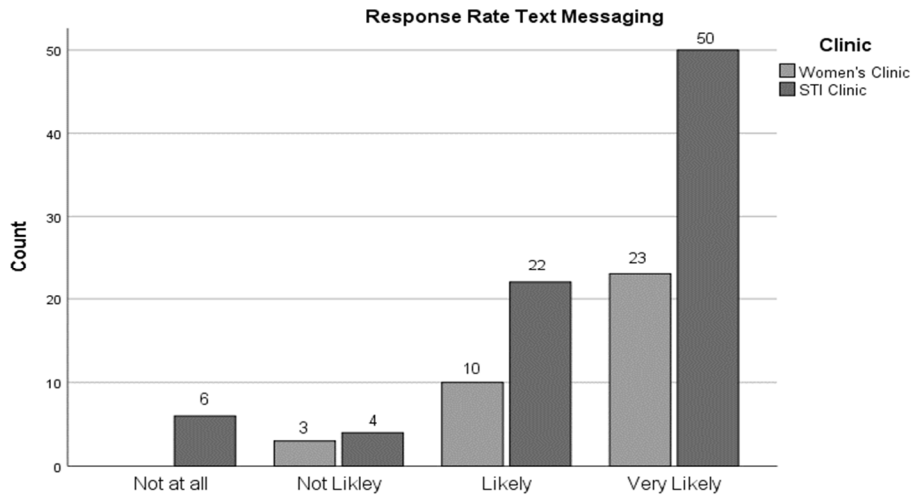

Figure 4. Graph of the response rate using text message

Research Question 3: Does notification preference vary depending on a normal or abnormal test result among African American women compared to other races?

$H_0$3: Notification preferences will not vary depending on a normal or abnormal test result.

H_a3: Notification preferences will vary depending on a normal or abnormal test result.

I used chi-squared to identify the notification preference of an abnormal test result (positive test result) or normal test result ranking from 1–7, least preferred to most preferred, (mail, unsecured email to personal email, secured email, text message, telephone call, secure internet web portal, and office visit.

In RQ3, the results of the chi-squared analysis revealed that there was a significant difference in the mean score in the preferred method of communication of an abnormal test result, X^2 (21, N = 118) = 36.5, p = .002 and a normal test result, X^2 (18, N = 118) = 26.7, p = .029. Thus, I conclude that text messaging is the preferred method of communication for an abnormal test result. The null hypothesis that notification preferences will not vary depending on a normal or abnormal test result is rejected. Tables 17–18 illustrate patient preference for receiving abnormal or normal test result by text messaging, phone, mail, office visit, secure email, and unsecured email.

Table 15

Cross Tabulation and Fisher's Exact Test of Abnormal Test Result Preference Notification

Abnormal test notification												
	n	Text	Phone	Mail	Portal	Office visit	Secure email	Unsecured email	Total	x²	df	p
African American	53	6	0	1	2	1	1	0	64	36.5	21	.002
White	15	3	3	1	0	0	0	0	22			
Hispanic	10	9	4	0	2	1	1	1	28			
Other	4	0	0	0	0	0	0	0	4			
Total	82	18	7	2	4	2	2	1	118			

Table 16

Cross Tabulation and Fisher's Exact Test of Normal Test Result Preference Notification

Normal test notification												
	n	Text	Phone	Mail	Portal	Office visit	Secure email	Unsecured email	Total	x²	df	p
African American	25	21	9	2	1	2	4	4	64	26.7	18	.029
White	9	6	5	1	1	0	0	0	22			
Hispanic	1	11	10	1	1	0	0	4	28			
Other	1	1	2	0	0	0	0	0	4			
Total	36	39	26	4	3	2	8	0	118			

Summary

The purpose of this study was to investigate whether text messaging is a viable means to improve communication and response rate among women with a positive gonorrhea test result. Participants in a local health department, women's clinic, and STI clinic were used to identify comfort level and adaptability of text message as a means of communication. The survey had a total of 118 participants, and all the surveys were reviewed and completed for inclusion in the data analysis. Upon completion of the data analysis, it was found that there was not a statistically significant association between the use of text messaging and the preferred notification method. In addition, it was found that there was no significant difference in using mobile devices among African Americans compared to other races. The results from the study create an opportunity to discuss the result notification and response rate among African Americans. Results will be discussed and interpreted in Chapter 5, which will address the limitations of the study, recommendations, and practical implications.

Chapter 5: Discussion, Conclusions, and Recommendations

Overview

This study focused on the examination of the preferred test result notification method between the patient and health care provider. The main purpose of the study was to answer three questions:

RQ1. Is there a significant statistical association between the use of text messaging and effective communication with health care providers?

RQ2. Does the adaptability of mobile devices as a means of communication increase patients' response rate to test notification?

RQ3. Does notification preference vary depending on a normal or abnormal test result among African American women compared to other races?

The three hypotheses from this study were:

$H_0$1: There is a significant statistical association between the use of text messaging and effective communication with health care providers.

H_a1: There is not a significant statistical association between the use of text messaging and effective communication with health care providers.

$H_0$2: Adaptability of mobile devices as a means of communication will not increase patients' response rate to test notification.

H_a2: Adaptability of mobile devices as a means of communication will increase positive response rate to test notification.

$H_0$3: Notification preferences will not vary depending on a normal or abnormal test result.

H_a3: Notification preferences will vary depending on normal or abnormal test result.

The variables in the study included independent variables (text messaging, phone call, social media, and mail) and dependent variables (response rate and preference). A data analysis of 118 completed surveys revealed that there was no statistical association between the use of text messaging and effective communication with health care provider, and adaptability of mobile devices as a means of communication will not increase positive response rate to test notification ($p > .05$). The notification method of test results did not affect patient response to a health care provider.

Interpretation of the Findings

The use of electronic communication increases accessibility to health care throughout the modern health care environment (Alotaibi & Federico, 2017). Communication using a mobile device for text messaging, telephone, or health care portal can provide instantaneous results to patients (Alotaibi & Federico, 2017). Previous studies revealed that 45% of urgent care patients do not follow up with a health care provider (Robeznieks, 2015). The use of an electronic communication method falls under the Meaningful Use requirement of the United States Government (CDC, 2016). As presented in Tables 6, 7, and 9, in Chapter 4, this study found that over 50% of the participants were *very likely* to respond to electronic test result notifications (text messaging, telephone, health care portal), and over 76% of individuals preferred to communicate by text messaging. Communication using a mobile device may be a reflection of the evolution of technology and easier access to health care providers.

Electronic communication in health care is inexpensive, quick, and convenient and a substitute for an office visits (Lee et al., 2017. In this study, 59% of the participants were aged 18–27, and African Americans represented 64.6% in the STI clinic and 30.6% in the women's clinic. Research has shown that communicating using a mobile device varies depending on age, literacy, encouragement given to patient by providers, and the patient–provider relationship (Lee et al., 2017). Fifty-nine percent of the participants in the study were 18–27 years of age. The findings showed that patients in the women's clinic and STI clinic response rate to receiving notification by mail was 28%. The most convenient form of communication among young adults is text messaging (Farber, Shafron, Hamadani, Wald, & Nitzburg, 2012). This study showed that, compared to other races, 44% of African American participants were comfortable communicating with a health care provider and *likely to respond* to test notification using text messaging, phone call, or health care portal. As presented in Chapter 4, there is no significant statistical association between the use of text messaging and effective communication with health care providers. Adaptability of mobile devices as a means of communication will not increase patient response rate to test notification. The preferred notification method is texting; however, patients are comfortable communicating with a health care provider using other methods (telephone, portal, or mail). The notification preferences did not vary depending on a normal or abnormal test result. Notification preferences varied based on the communication method, but there was no preference in the notification of an abnormal or normal test result. This is an interesting finding in that patients had a

preference in which method they preferred; however, the test result, whether abnormal or normal, was not a factor.

When it comes to test result notification, no prior studies I found have focused on communication methods between patients and health care providers in a local health department. I explored the preferred communication method and the adaptability of communicating using an electronic mobile device. Text messaging is a powerful communication tool to allow the receiver to receive the message that is customizable and meets the individuals' needs (Karasz, Eiden & Bogan, 2013).

Limitations of the Study

The limitations of my study were time constraints, variation in the level of education, and the unwillingness of participants to participate in the study. Internal validity contributed to limitations in this study. Many individuals needed assistance with Question 6 on the survey, which asked them to rank as follows: 1, *most preferred* to 7, *least preferred* for the notification method of an abnormal or normal test result. The registration clerks had to assist many participants.

Representativeness of the sample and generalizability of the results are concerns of external validity. Over 50% of participants represented in the women's clinic were Hispanic, and 64% of participants represented in the STI clinic were African American. The number of African Americans seen in the women's clinic was not represented due to the population and the number of returned surveys. The women's and STI clinic services are provided on either an appointment or walk-in basis.

Implications

The results from this study may provide valuable information about the use of text messaging as a means of communication between patients and health care providers. The study findings include three distinct themes: (a) text messaging is the preferred communication method for test result notification; (b) patients will respond to test result notification using an electronic mobile device (text messaging, health care portal, email, or telephone); and (c) patients are comfortable using an electronic device to receive normal or abnormal test results. The results of this study might provide additional communication options to allow patients to respond to text notification promptly and decrease gonorrhea rates. Prompt responses to text notification may decrease the number of attempts health care providers are mandated to provide to contact a patient. Additionally, the study may contribute to the knowledge of communication methods used in a local health department. This will bring about a positive social change in the community and throughout North Carolina. Health directors and leadership are the target audience of the study findings.

Recommendations for Action

This study can be conducted in other health departments that utilize electronic methods for patient communication and notification of test results. The results will be valuable to health departments with increasing STD rates and limited communication methods. Using various communication methods will allow more opportunities for patients to respond to test result notifications and appointment reminders and to receive health care education. One recommendation is to test the notification response rate using

text messaging, health care portal, and email. Another recommendation is to alter follow-up procedures for positive GC test results, as follows: The first attempt is a text messaging notification, second attempt a telephone call, third attempt a letter sent to the client via regular mail, and fourth attempt a certified registered (restricted) letter sent to the client. Utilizing text messaging as a form of communication will provide additional opportunities for a rapid response.

Recommendation for Further Research

In this study, I collected data from a local health department. The survey was conducted in two clinics, which limited the sample size. The findings can be generalized, and future researchers can expand the research in other clinics and hospitals. Technology and health care are constantly evolving. I recommend a follow-up study to collect qualitative data that can be used over an extended time frame. Additionally, a larger data set can be added to test the preferred communication methods.

Reflection

In this study, I explored the use of preferred communication method for test result notification in a local health department. During the study, I read 100 peer-reviewed articles associated with text messaging, electronic communication methods, and patient–provider communication in health care. My academic experience at Walden University was enriched by the scholarly reading and analysis of the data. With guidance from Walden faculty, I was able to learn research methodology that will assist me in my future endeavors. This journey has helped me grow as a scholar and professionally.

Conclusion

The purpose of this quantitative study was to explore text result notification and patient-preferred communication method. The use of the technology acceptance model as the conceptual framework aligns communication methods with the perceived usefulness and ease of use. The data revealed that electronic communication is acceptable, and preferred, by patients. The study findings should provide insight and guidance to public health departments wanting to apply innovative ways to notify patients of test results. The use of text messaging as a form of communication can provide a prompt response, health care accessibility, and improve gonorrhea response rates, resulting in positive social behaviors. The social impact is a decrease in gonorrhea rates among African American women. I would recommend that future research include a variety of demographic locations and health care facilities.

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Appendix A: Research Consent

Lashonda Ouk
Fri 12/21/2018, 6:35 PM

December 21, 2018

Dear Mr. Cram,

My name is Lashonda Ouk. Currently, I am a doctoral student at Walden University. I am currently working on my doctoral study proposal focused on patient preference for test result notification in a local public health department. Upon review of the literature, I had noted the survey instrument that you had used for your own research project "Patient Preferences for Test Result Notification."

It is with great respect and courtesy that I am asking for your consent to use your survey instrument for the purpose of my own study. I do understand that with your consent, the appropriate credit and citation will be given in my study. If there is any additional information that you may require, please feel free to contact me. Thank you in advance for your response.

Sincerely,
Lashonda Ouk
Doctoral Student – Walden University

Cram, Peter < >
Sat 12/22/2018, 5:15 AM

Lashonda,
Sure thing. Glad to be of help. Sounds like a great area for research.
Do you need the actual survey instruments? They should be publicly available through PubMed, but if you can't find them, I'm happy to email them.
Cheers, Pete

Peter Cram, MD, MBA
Director, Division of General Internal Medicine and Geriatrics
University Health Network and Sinai Health System
and Professor of Medicine
University of Toronto

Appendix B: Patient Test Notification Preference Survey

Patient Test Notification Preference Survey

The purpose of this survey is to identify the most effective communication method to communicate with patients. We would like for you to share your preferred communication method to be notified that your test results are available.

☐ By checking this box, you give Public Health permission to notify you that your test results are ready. Public Health is not responsible for any data charges that may apply.

<u>This survey is for research purposes only.</u>

Test results will not be sent via text message, mail, Facebook, email, or health care portal.

DIRECTIONS: Indicate your response by filling in the appropriate square next to the correct answer.

1. Age
   - 18–27
   - 28–36
   - 37–45
   - 45–54

2. Race (select all that apply)
   - African American
   - White
   - Hispanic
   - Other

3. Do you currently own a cell phone with texting capabilities?
   - Yes
   - No

4. Which method do you primarily use your cell phone for?
   - Texting
   - Calling
   - Social media

5. What is your highest level of education?
   - Some high school
   - High school diploma
   - Some college
   - College graduate

6. How would you like to be notified of an abnormal gonorrhea (positive test result)? If you feel there are any unacceptable ways to be notified, write “No” in the space provided.

Method	1 = most preferred, 7 = least preferred)
Letter by U.S. mail	
Unsecured email to your personal email account	
Secure email (password protected to ensure confidentiality of data)	
Text message	
Telephone call	
Secure internet web portal (password protected to ensure confidentiality of data)	
Office visit to your health care provider	
Other: Please specify	

7. How would you like to be notified of a normal gonorrhea (negative test result)? If you feel there are any unacceptable ways to be notified, write “No” in the space provided.

Method	1 = most preferred, 7 = least preferred)
Letter by U.S. mail	
Unsecured email to your personal email account	
Secure email (password protected to ensure confidentiality of data)	
Text message	
Telephone call	
Secure internet web portal (password protected to ensure confidentiality of data)	
Office visit to your health care provider	
Other: Please specify	

8. How likely are you to respond to the following?

	Very likely	Likely	Not likely	Not at all
How likely are you to respond to a health provider when contacted by text messaging?				
How likely are you to respond to a health provider when contacted by telephone call?				
How likely are you to respond to a health provider when contacted by mail?				
How likely are you to respond to provider when contacted using a health care portal?				

9. Select your comfort level when communicating with a health care provider.

	Very comfortable	Comfortable	Somewhat comfortable	Not comfortable
How comfortable are you communicating using a cell phone?				
How comfortable are you communicating with a health care provider using text messaging?				
How comfortable are you communicating with a health care provider using a health care portal?				
How comfortable are you about the confidentiality of your test results? (Are you comfortable that your medical information might be obtained by unauthorized individuals?				

This concludes our survey. I would like to thank you for participating and helping to improve how we deliver health care.